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ABSTRACT

The National Energy Education Development (NEED) Project was launched by Congressional Resolution in 1980. The subsequent presidential proclamation initiated a decade-long effort to introduce or enhance energy education programs in U.S. schools. The NEED Project stresses the use of evaluation tools for students to measure the effectiveness of their school's energy education program. The NEED Energy Education Poll was designed as an activity students could utilize to evaluate the success of their projects and activities. It also allows the NEED Project to gauge the progress of a large number of students throughout the nation involved in energy education. The information gathered from the state and national poll results allows NEED to discover where students lack information about energy, as well as how they feel about energy issues. This document includes the results of the secondary and middle school polls, a copy of the "1990 NEED Energy Education Poll" and a chart of the distribution of answers. (CW)

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The Nation's Energy Education Report Card

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The National Energy Education Development Project

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Project Background

The National Energy Education Development (NEED) Project was launched by Congressional Resolution in 1980. The subsequent presidential proclamation initiated a decade-long effort to introduce or enhance energy education programs in all of our nation's schools. The NEED Project believes that concerned, energy-literate students will become informed adults – capable of making intelligent energy decisions and formulating wise energy policies.

In the ten years since its founding, NEED has become a network of thousands of students, educators, and community leaders from across the country – planning and participating in year-long energy programs. During the 1989-90 school year, NEED's national network will include 32 state committees, 182 regional committees, and over 4,000 schools.

Purpose of Poll

The NEED Project stresses the use of evaluation tools for students to measure the effectiveness of their school's energy education program. The NEED Energy Education Poll was designed as an activity students could utilize to evaluate the success of their projects and activities. Students administer the Poll both before and after their energy education activities, allowing them to accurately gauge their effectiveness. By administering the Poll before the project begins, the student body becomes more in tune with what they will be learning.

As a secondary effect, the Poll allows the NEED Project to gauge the progress of a large number of students throughout the nation involved in energy education. Because the number of students participating in the Poll is so large, it serves as a "census" on energy issues. The information gathered from the state and national Poll results allows NEED to discover where students lack information about energy, as well as how they feel about energy issues.

Polling Procedures

Once students and teachers decide to administer the Poll, they request the appropriate number of scanning cards from the NEED Project. Scanning cards are available on two grade levels: 4th - 8th, and 9th - 12th. Upon receipt of the cards and a set of instructions for administering the Poll, the students go into the classrooms and administer the Poll. Once the Poll cards are collected and sent back to NEED Headquarters, they are electronically scanned to determine the final results. Students receive these results in the form of graphs on each of the items in the Poll, along with averages and percentages which they may utilize. Since students administer the Poll a month or more before their energy education activities begin, they can analyze these results and design their projects accordingly. When the projects are completed, students once again request scanning cards and administer the Poll. Students are able to measure the success of their efforts by comparing the post-poll and pre-poll results.

The polling process is one of the many aspects of NEED that helps students become the "owners" of their own education. This ownership extends beyond their own school to the state and nation as well. Students develop a sense of camaraderie by participating in a poll that involves hundreds of schools nationwide.

Polling Instruments

The secondary and middle school Polls both contained eleven knowledge questions – the secondary version had five possible repsonses to each question, and the elementary version had four. Each question had I DON'T KNOW as its final response. Students were encouraged to use this response if they had absolutely no idea of the correct answer and were unable to make an educated guess. This option was used roughly one quarter of the time by secondary students and elementary students.

The eleven questions for both elementary and secondary school students fell into three levels of understanding. Students did score higher on the basic level questions and had an equal degree of difficulty answering questions in the moderate and upper levels.

Knowledge questions were designed to measure students' recognition of significant factual information and scientific concepts relating to energy. When students were asked for percentages or other quantitative numbers, the figures given for each response were always significantly spaced so as to separate the choices into three or four distinct levels of magnitude.

Similar energy knowledge questions were found on both the Middle School and Secondary Polls. Teachers also took the Secondary Poll, allowing NEED to track the responses of students from grades five through twelve to adult on certain topics. Students' knowledge of these energy concepts or topics increased only slightly, if at all. For example, only 25 percent of the students could consistently correctly identify the major use of coal. Teachers correctly answered the question 65 percent of the time. The same pattern was true when students and adults were asked the price of a kilowatthour of electricity. Students consistently scored about 10 percent correct, and teachers about 33 percent.

On opinion questions secondary school students were given the following choices: strongly agree, agree, disagree, strongly disagree, or undecided/no opinion. Prior to deciding how they felt about a statement, the student would read a concise paragraph about the energy issue, such as the development of energy resources from offshore areas or background on laws to save energy.

Educator Survey

Educators from 15 states were surveyed to determine the level of energy education instruction in our nation's schools, and the importance educators give to energy education. Educators from almost one hundred schools were surveyed. The 2001 educators were asked to identify themselves according to the subjects and grade levels they teach and the number of years in the teaching profession.

In previous surveys of this type, mass mailings were made randomly to teachers. Results were compiled based on those questionaires which were returned; usually a 25 percent return rate. This year, the NEED Energy Education Survey proceedure involved having a faculty member survey the entire teaching staff on eight questions.

Science teachers, as expected, taught the most about energy and felt the most informed about energy issues. Science teachers also felt the most concern about the availability of affordable energy during the next ten years. Social studies teachers were second in all three areas. All educator groups considered themselves more than moderately informed about energy, and all groups were very concerned about the cost and availability of energy supplies in the 1990s.

Educators were asked to check one to five factors that would influence their involvement in energy education. The single reason most educators cited as a factor to increase energy instruction was because students asked questions about energy. Only two percent of the teachers could think of no reason that would get them to teach about energy.

The final survey question asked educators about the emphasis their district gives to energy education. Over two-thirds of the educators responded their districts had little to no emphasis, or didn't know.

More Poll Information

Many schools are using the NEED Energy Education Poll as an activity for their NEED Week program in March. NEED anticipates an additonal 7,000 student response cards will be processed during the month of April. Post Poll cards will also be sent to NEED for processing in April. Analysis of present poll data shows consistent results when Poll data is tabulated using a variety of norm groups and other reliability factors.

This report does not contain all the items and numerous reporting categories. For those interested in recieving the final tabulations of results for a particular grade level, state or other method of classification please contact the NEED Project.

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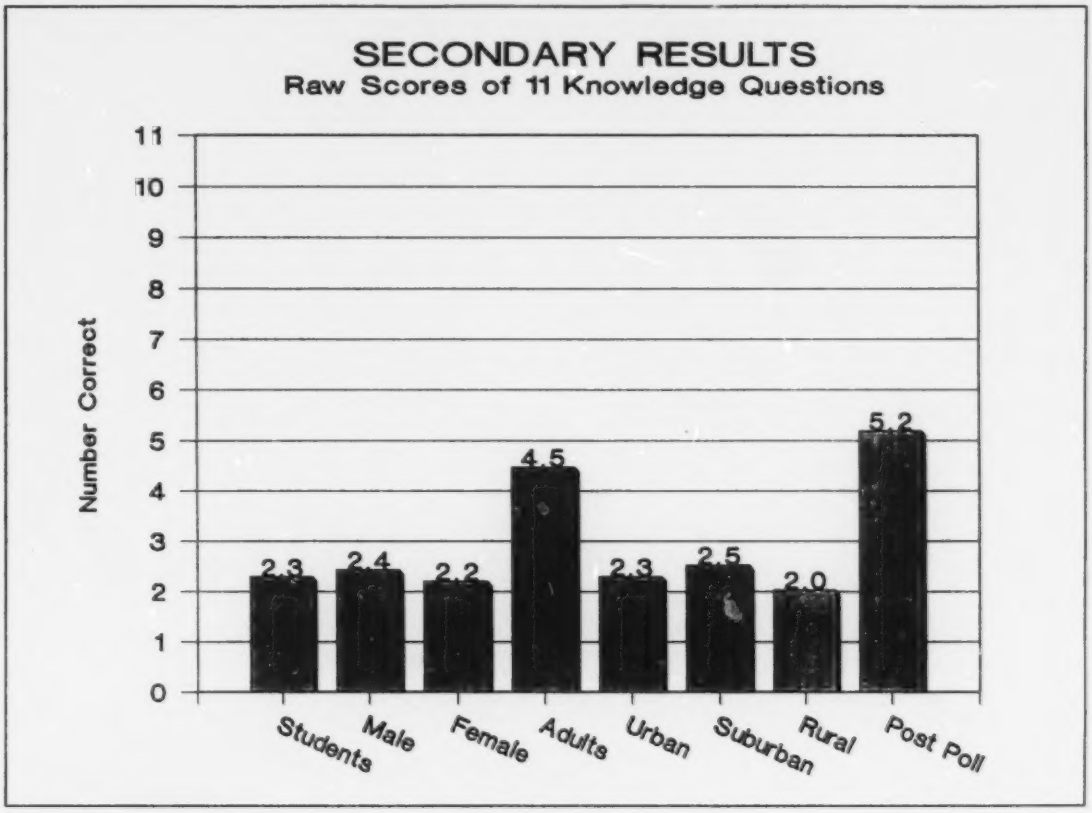


The secondary school version of the NEED Energy Education Poll was taken by 11,921 students and 343 teachers. The poll shows that while most students characterize themselves as energy-savers, few demonstrate sufficient knowledge of the scientific or economic aspects of energy they need to be informed consumers and to make wise choices about complex energy issues facing citizens. For example, most students were only able to correctly answer two to three of the 11 knowledge questions on the poll. Most cumulative school scores ranged between 1.8 and 2.6, with the highest school score being 2.8.

The average raw score of 2.3 was not the result of many students answering the same two or three basic knowledge level questions correctly. In fact, the question most frequently answered correctly (identifying heating and cooling as a home's largest energy-consuming job) had only 44 percent of the students selecting it. Most questions were only answered correctly between 10 and 25 percent of the time.

Answers to some specific basic knowledge level questions showed that only a quarter of the students knew that the major use of coal is to produce electricity or that natural gas is used to make plastics. The scientific concept question on the poll showed students' lack of knowledge about energy conversion and efficiency—only a quarter of the students knew that development of a 100 percent efficient machine was impossible.

The poll also contained ten opinion questions. Student responses on these questions showed keen interest in having the government pass laws to have people sort their trash. While at the same time, students felt government should stay out of the business of setting fuel mileage standards.

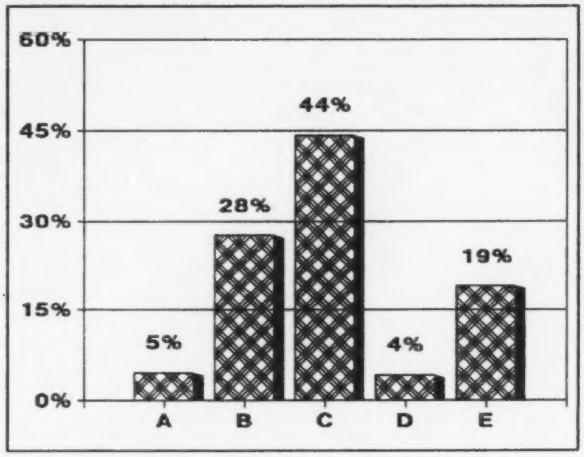
Teachers taking the poll scored better than their students with two-thirds of the teachers answering the basic knowledge questions correctly. They also correctly answered the middle and upper level knowledge questions twice as often as the students answered them. Still, only a little more than half the teachers understood that the development of a 100 percent efficient machine was impossible.

SECONDARY

Grades 9 - 12

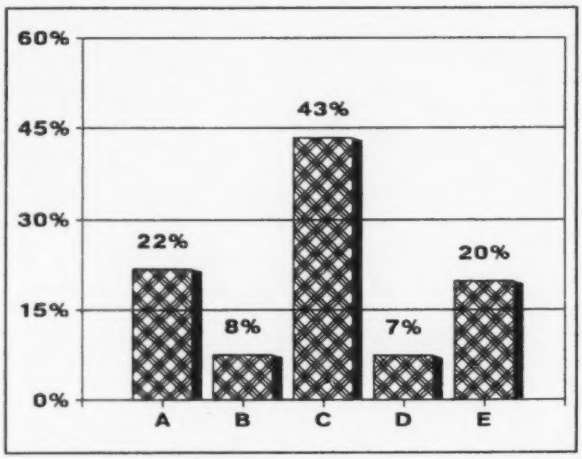
Are you the type of person who is always careful not to waste energy? Does it bother you to see a light on in an empty room, or hot water being run needlessly, or home heating and cooling dollars being wasted? Which of the following statements best describes your energy saving habits?

A. Super Energy Saver
B. Energy Saver
C. Occasional Energy Saver
D. Energy Waster
E. I usually don't pay attention to my energy use



Which energy job consumes the greatest amount of energy in the American home during a year?

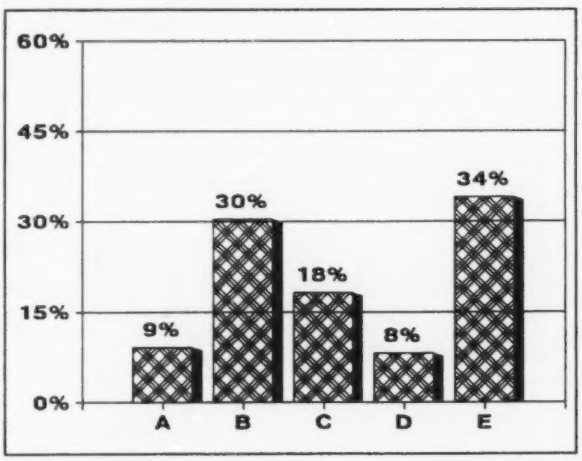
A. Lighting
B. Refrigeration
C. Heating/cooling rooms
D. Heating hot water
E. I don't know



American automobile manufacturers can produce automobiles with higher mileage ratings. They can accomplish this by making cars smaller and lighter, with engines designed for efficiency rather than performance. Today, Americans want to purchase larger cars with high performance engines. Federal law could require the manufacture of more fuel efficient automobiles, which would extend gasoline supplies for many more years and help reduce air pollution. However, these regulations would limit the choice of the American car buyer and may hurt the domestic auto industry. Which of the five phrases below reflects your opinion on the following statement?

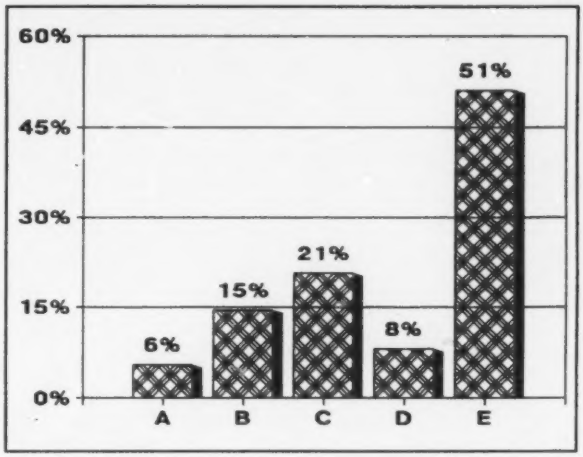
Consumer-buying habits, rather than federal law, should determine the fuel efficiency standards U.S. automakers should meet for their new cars.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided



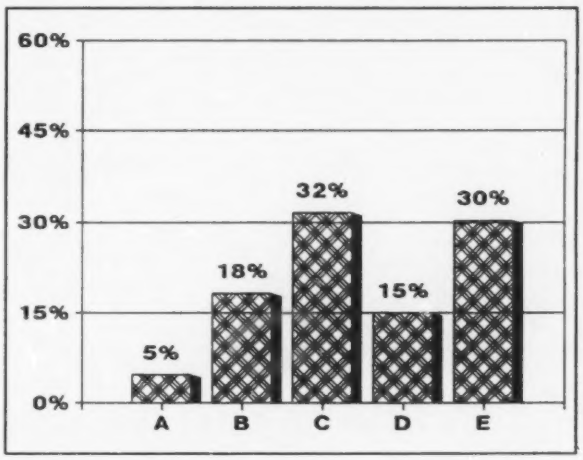
Wind, geothermal, biomass, solar and hydroelectric are renewable sources of energy. What percent of the nation's total energy demand in 1988 was provided by renewable sources of energy?

A. 1%
B. 10%
C. 33%
D. 67%
E. I don't know



Not enough petroleum (oil) is produced in the U.S. to meet the nation's demand for this transportation fuel. We must purchase or import petroleum from other countries each year. At what level would you feel that imports were starting to approach a dangerously high level, threatening the nation's economic and military security?

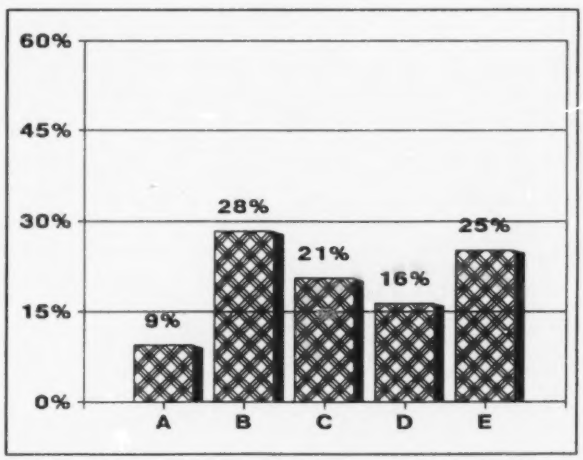
A. 10% of demand
B. 33% of demand
C. 50% of demand
D. 75% of demand
E. I don't know



Some feel that America's petroleum resources should be developed in Alaska's Arctic National Wildlife Refuge and in offshore areas. More domestically produced petroleum would reduce the level of imports and provide American jobs. Others feel that these areas are too valuable to chance an environmental mistake, and that we should buy petroleum from other nations while it is cheap. They feel that we should drill in these environmentally sensitive areas only when it is absolutely necessary. Some feel that this time has come, since it takes over five years to develop an oil field. Which of the five phrases below reflects your opinion on the following statement?

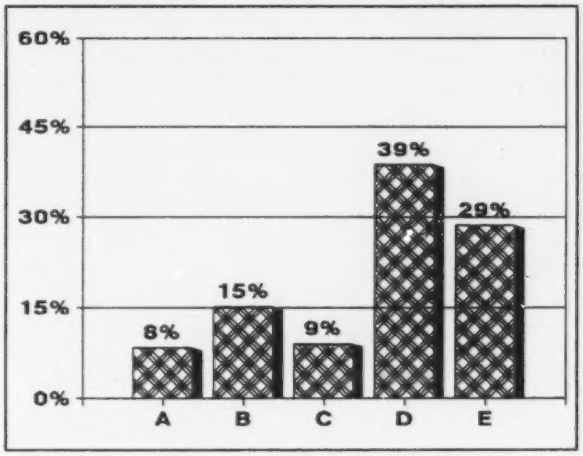
The federal government should allow exploration and development of petroleum resources in Alaska and from offshore areas as soon as possible.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided



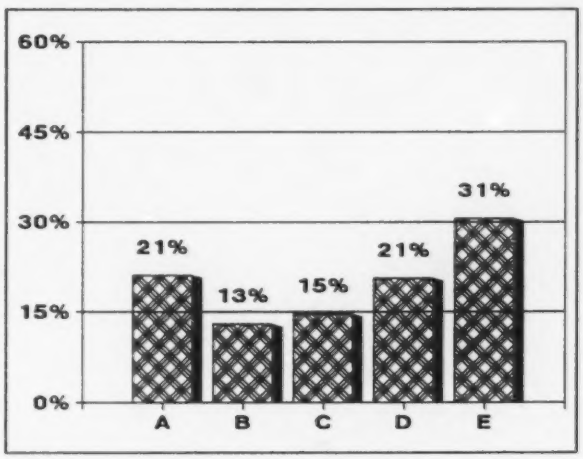
Many people are suggesting that more natural gas (methane) be used instead of coal and petroleum in the future. This is because natural gas is...

A. the nation's most abundant fossil fuel.
B. the cleanest of the fossil fuels.
C. the cheapest source of heat energy.
D. All three of the above reasons.
E. I don't know.



The U.S. has approximately 300 years of known coal reserves and is the world leader of known coal reserves. In 1988, the major use of coal in the U.S. was to:

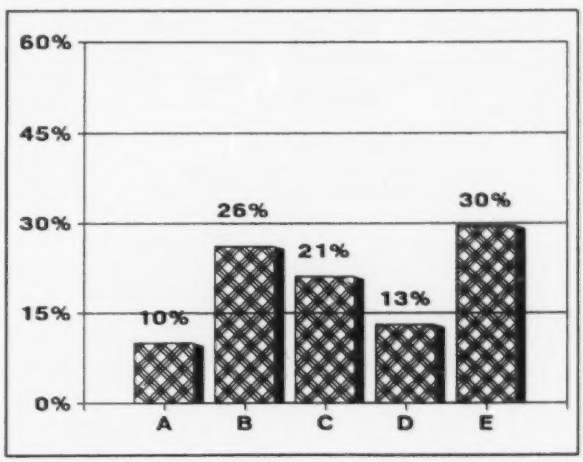
A. make electricity.
B. fuel trains.
C. make steel.
D. heat homes and buildings.
E. I don't know.



Advocates say that nuclear power reduces U.S. dependence on imported petroleum, saves consumers millions of dollars each year, does not cause air pollution or contribute to global warming, and that nuclear power plants are safe to operate. Opponents of nuclear power say that the power plants are unsafe because of their construction and operation. They also say that nuclear power plants usually run way over budget, and that consumers are forced to pay for the mistakes of utility companies. Supporters of nuclear power say that cost overruns are the result of needless delays and regulations. Which of these five phrases reflects your opinion on the following statement?

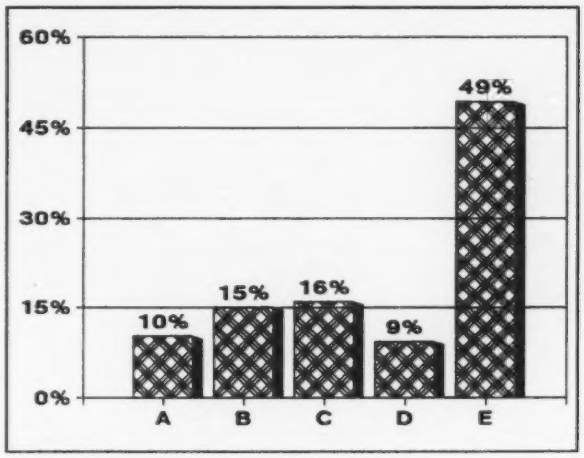
Nuclear power should play an increasing role in providing the nation with its future electrical energy demands.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided



One kilowatt hour of electricity will operate a television set for approximatley ten hours. In 1988, what was the average price for a kilowatt hour in the U.S.?

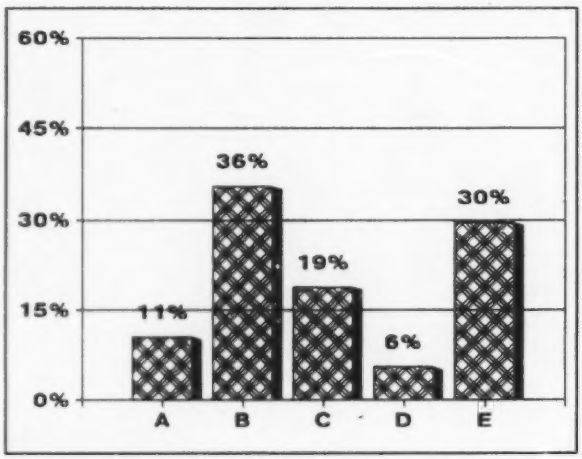
A. $0.08
B. $0.57
C. $1.07
D. $1.70
E. I don't know



If a power plant could convert into electricity all the heat energy it produces from burning a fossil fuel we would say it was 100% efficient. Today's electric power plants are 30-45% efficient, up from just a 10% efficiency in the early 1900s. Which of these five phrases reflects your opinion on the following statement?

Improved technology will eventually enable power plants to be 100% efficient, converting all the energy they consume into electricity.

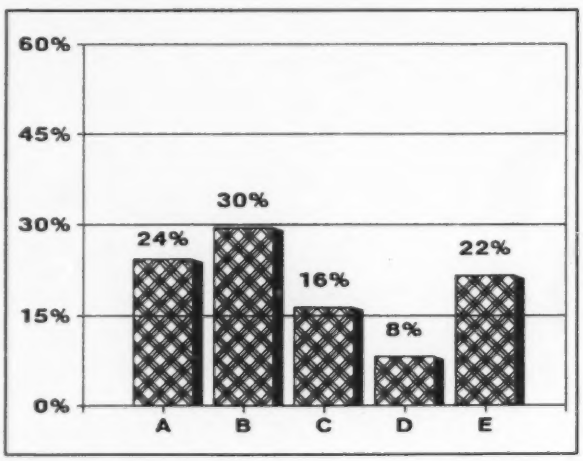
A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided

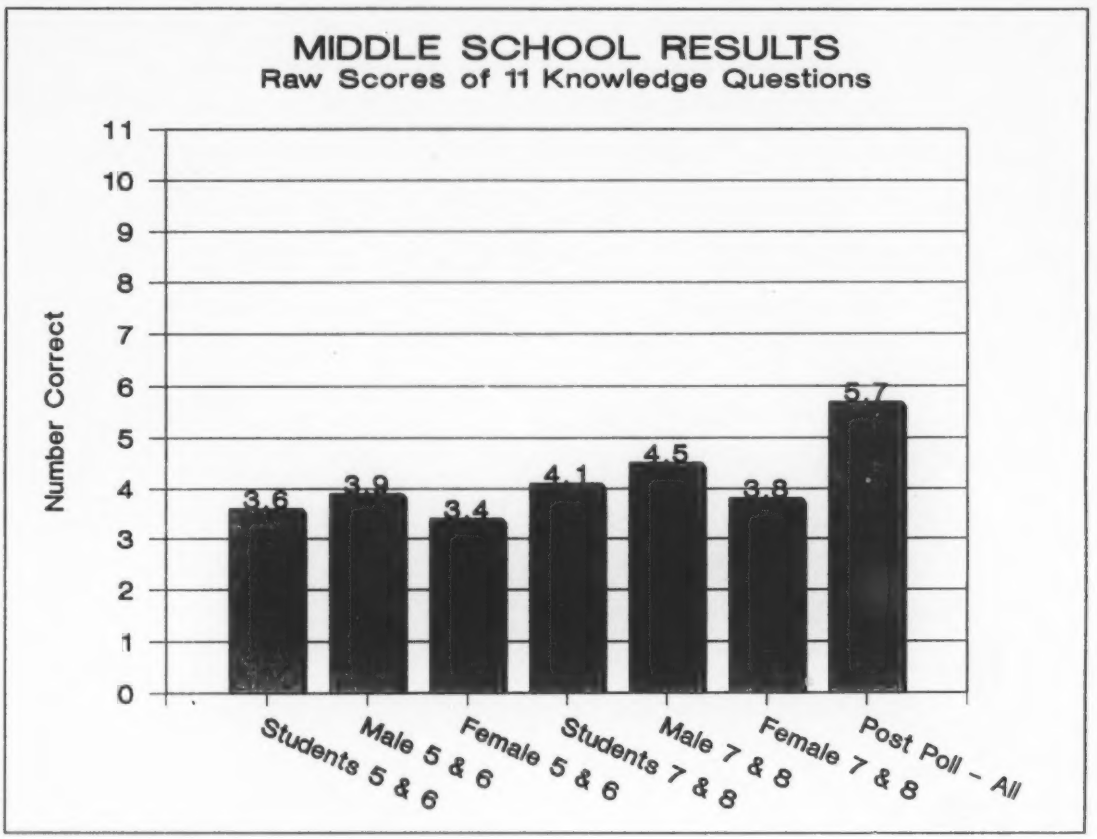


America's throwaway society is fast running out of space to toss its trash. In recognition of this, and in order to save energy, some communities have enacted mandatory recycling programs where residents must pay deposits on bottles and cans, or must sort their garbage for trash pickup. Other communities have set up voluntary programs where residents can sort their garbage if they want to. Some of these programs can be very successful. Most community planners agree that recycling is important, but disagree about the type of recycling program. Which of the five phrases below reflects your opinion on the following statement?

Americans should be required by law to separate their trash into three or more containers for recycling purposes.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided





The middle school version of the NEED Energy Education Poll was taken by 12,326 students in grades five through eight. Most students were only able to correctly answer three to four of the 11 knowledge questions on the poll. Most cumulative school scores ranged between 2.5 and 3.9 with the highest school score being 4.8.

The average raw score of 3.4 was not the result of many students answering the same three or four easy questions correctly. In fact, the three questions most frequently answered correcly only had about half the students selecting them. Most of the poll questions were answered correctly between 20 and 35 percent of the time.

Raw scores for seventh and eighth grade students were only slightly higher than fifth and sixth graders. The reason for the slightly higher score was primarily because the older students scored higher on several of the four basic level energy knowledge questions. Eighth grade students scored 4.4—primarily because energy education in most states is taught in the eighth grade. When eighth grade students took the secondary school poll, they often did better than their high school counterparts.

Energy education materials directed towards students in these grade levels contain sections on the scientific process which enabled the formation of fossil fuels. Yet when asked why coal, petroleum and natural gas are called fossil fuels, only one half the students knew they were formed from the buried remains of plants and animals that lived millions of years ago.

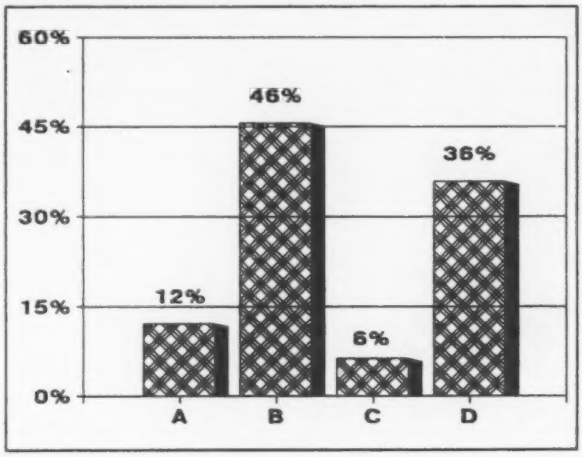
When asked which statement best decribes why an energy source is classified as a renewable fuel, only a half could. Again, this concept is always presented in energy curriculum materials, and always found on a list of a science education objectives for these grade levels. Another scientific concept question showed that only one third of the students understood how energy is released during nuclear fission.

MIDDLE SCHOOL

Grades 4 - 8

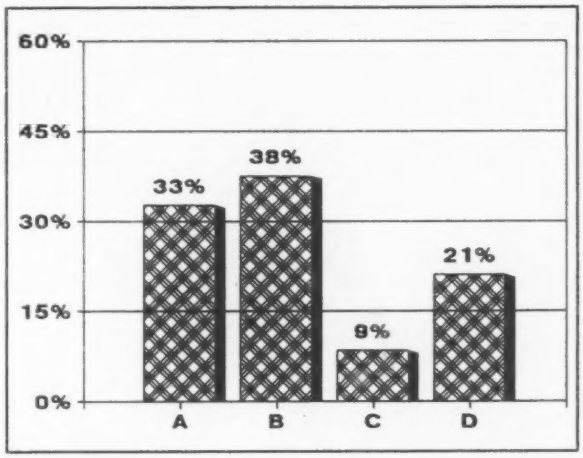
Which of the following statements best describes your energy saving habits?

A. Super Energy Saver
B. Energy Saver
C. Energy Waster
D. I usually don't pay attention to my energy use



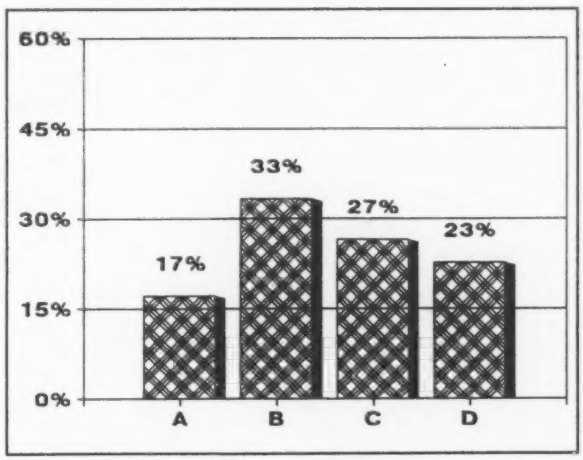
Which energy job uses the greatest amount of energy in the American home?

A. Lighting
B. Heating/cooling rooms
C. Heating hot water
D. I don't know



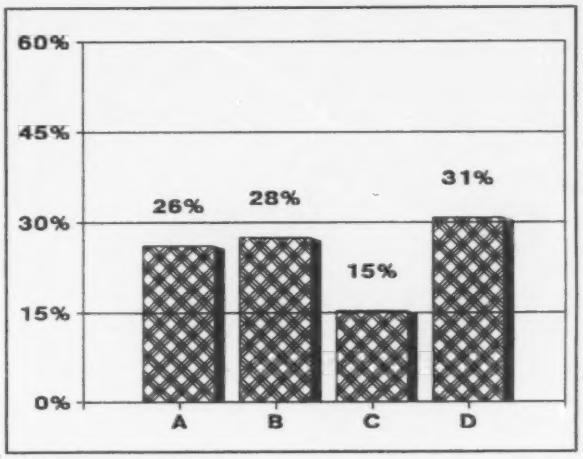
Should laws be made to force people to save energy in their cars and homes?

A. Definitely no
B. Only in an emergency
C. Yes, because people won't do it on their own
D. I'm not sure



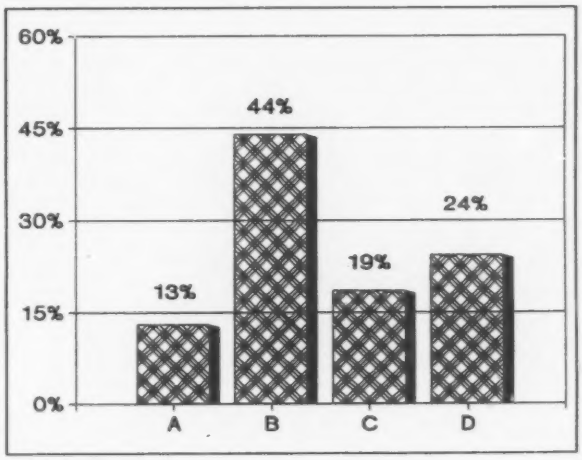
The U.S. has a 300-year supply (more than the other two combined) of which fossil fuel?

A. Coal
B. Natural Gas
C. Petroleum
D. I don't know



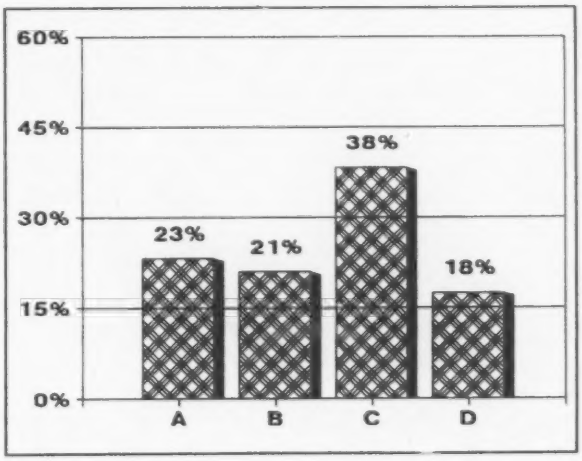
Which is the cleanest-burning fossil fuel?

A. Coal
B. Natural Gas
C. Petroleum
D. I don't know



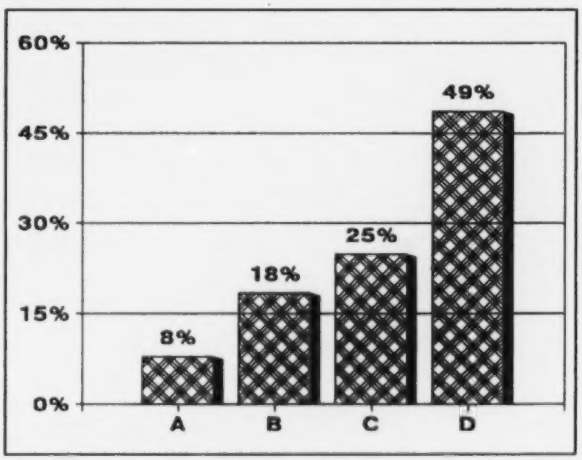
The major use of coal in the United States is to:

A. make electricity
B. fuel trains
C. heat homes and buildings
D. I don't know



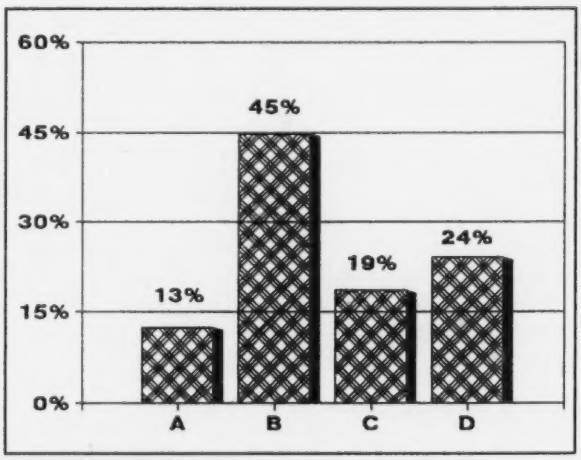
One kilowatt hour of electricity will operate a television set for approximatley ten hours. In 1988, what was the average price for a kilowatt hour in the U.S.?

A. $0.08
B. $0.57
C. $1.07
D. I don't know



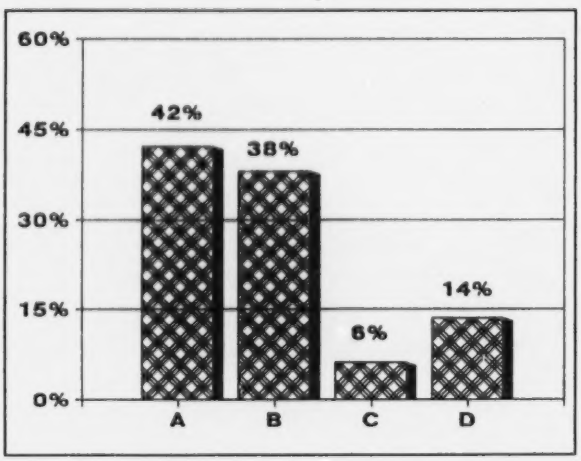
Nuclear power doesn't pollute the air, it is cheap and helps save fossil fuels. A major problem with nuclear power is the danger of the radioactive waste it produces and the possibility of nuclear accident. Which statement best describes your feelings about this?

A. We should build more nuclear plants.
B. We shouldn't build any more nuclear plants, but it's fine to continue using the ones we have.
C. We shouldn't build more nuclear plants and should stop using the ones we have.
D. Undecided.



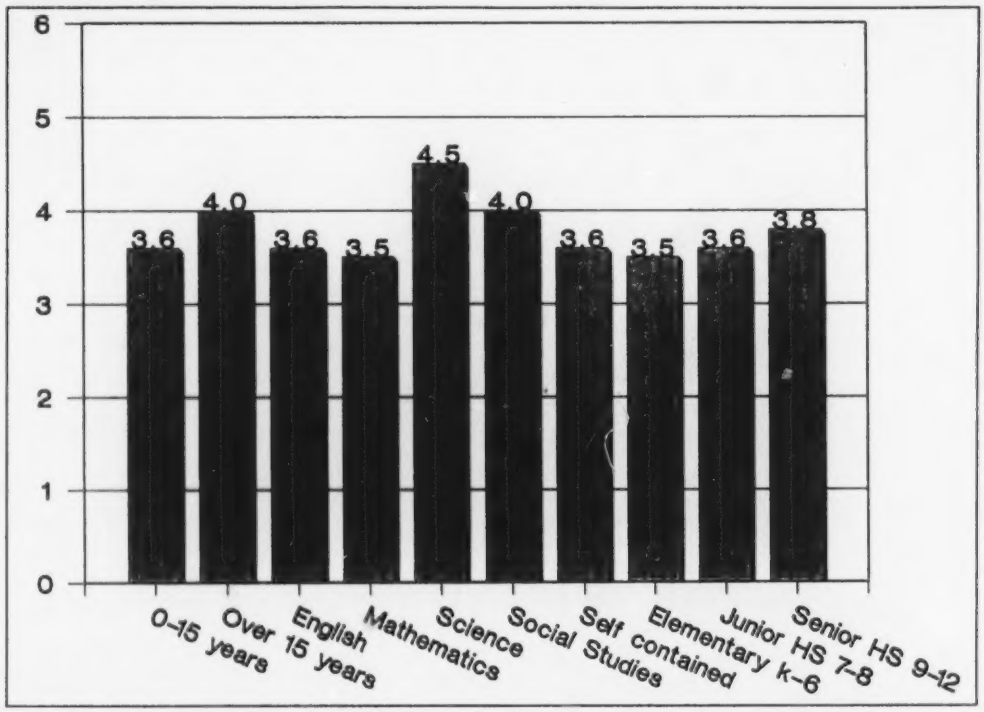
In many communities, laws have been made that require people to put glass, metals and paper into separate trash containers so that they can be recycled. Which statement best describes your feelings about this?

A. I think this is a great idea and would like my community to have this law.
B. I think people should separate their trash, but I don't want a law that forces us to do it.
C. I don't think recycling is important.
D. Undecided.

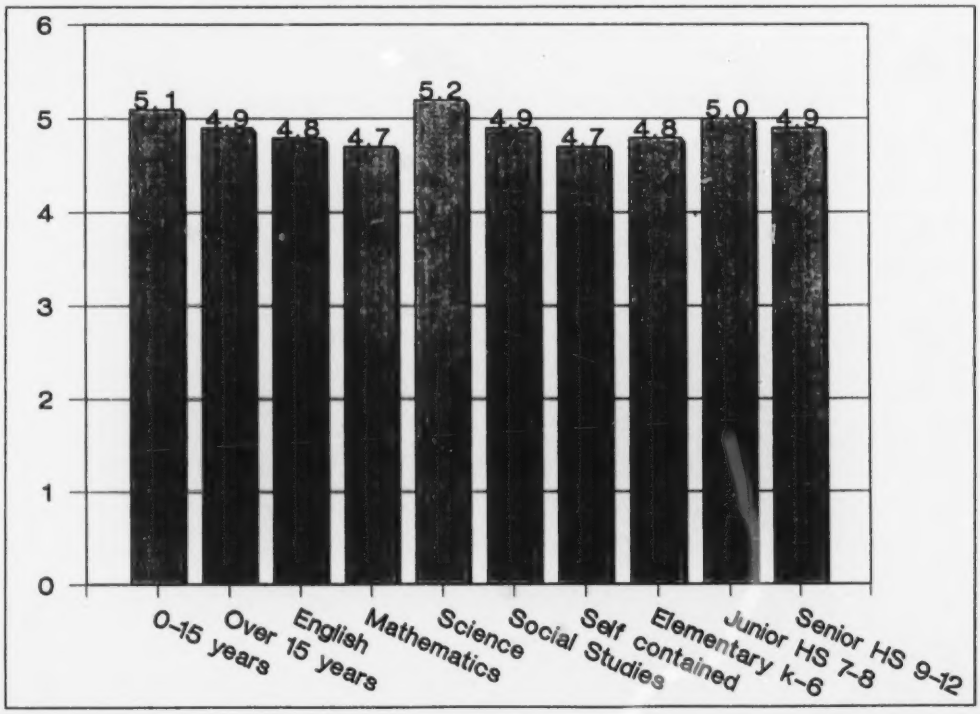


Energy Education Survey Results

On a scale of zero to six (six representing very informed and zero representing not informed), how informed are you about energy issues and concerns?

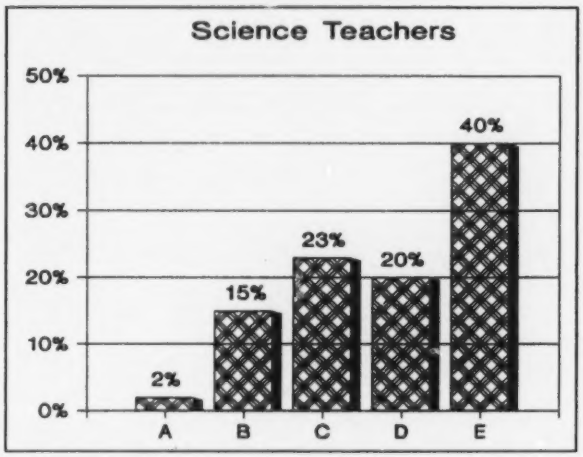


On a scale of zero to six (six representing very concerned and zero representing not concerned), how concerned are you about the availability of affordable energy during the next ten years?



How many hours of classroom instruction do you give to energy education each year?

A. 0 hours
B. 0-2 hours
C. 2-5 hours
D. 5-10 hours
E. 10+ hours



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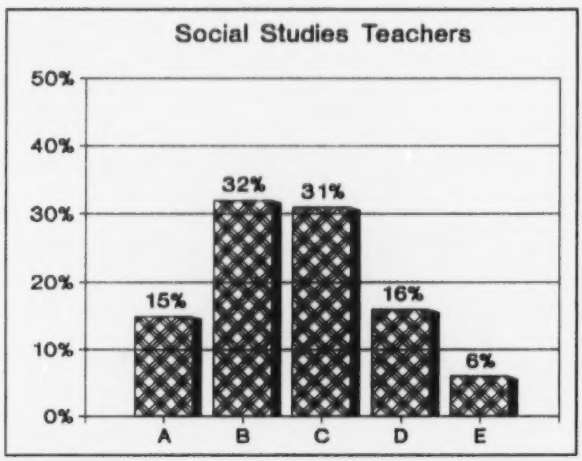

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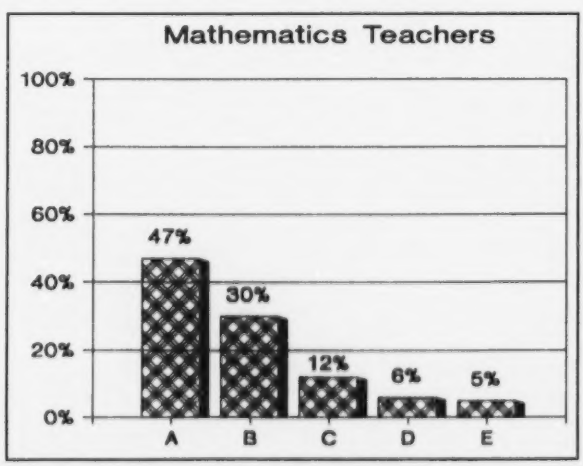

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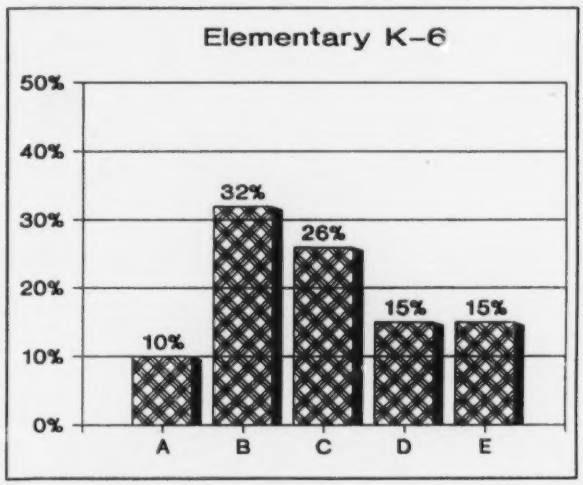
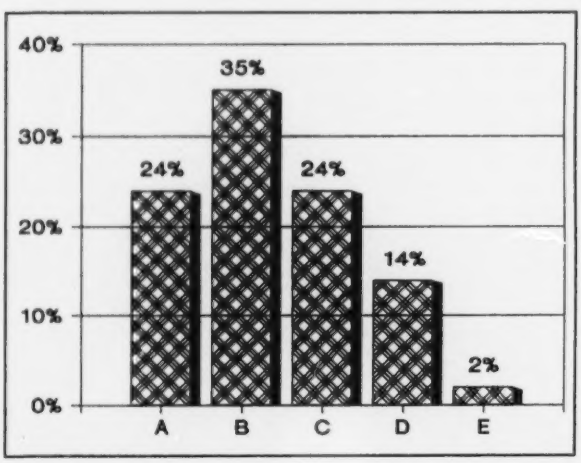


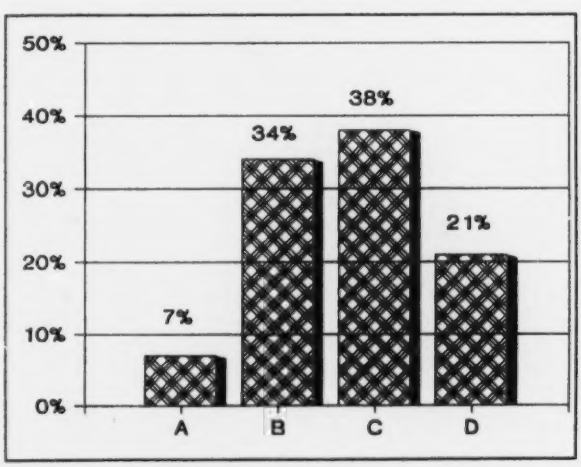
What factors would probably influence your involvement in energy education?

A. If I thought it was important, e.g., energy crisis.
B. If students asked questions about it.
C. If the administration encouraged us to teach it.
D. Currently spend all the time I can afford on energy.
E. Can't think of anything that would get me to teach about energy.



To what degree does your school district emphasize energy concepts/issues in curriculum policy and curriculum guides?

A. Strong emphasis
B. Moderate emphasis
C. Little/no emphasis
D. Don't know.



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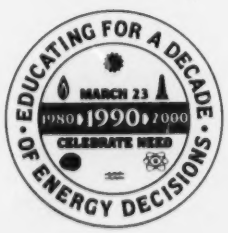

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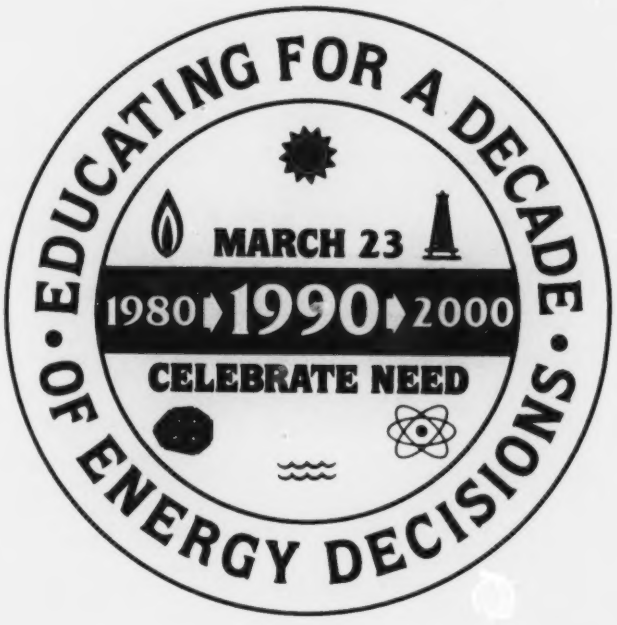
The NEED Energy Education Poll, a great activity for 1990

1990 NEED Energy Education Poll



How much do students and adults really know about energy?

How do they feel about certain energy issues?

Use NEED's 1990 Energy Education Poll to find out.

Conducting a pre-NEED and/or post-NEED Energy Education Poll might seem like a major job, especially if statistics scare you off. However, having your school participate in this nationwide poll will actually be quite easy.

The first thing your school needs to do is request the appropriate number of NEED Energy Education Poll scanning cards (elementary or secondary) for those who will be taking the poll. Grade levels indicated below are suggested, not required. Decide if you want to administer the poll to all students, or to just a select group of students, i.e., full-year science students or a random sample of the student body. Also, decide if you want to poll teachers and adults in your school community. Once you've come up with a number, fill out the form below and mail it to NEED. Along with your scanning cards, we'll send you information with helpful hints on how to best administer the poll.

Once you have administered the poll, just mail back the completed scanning cards to NEED Headquarters, and we will take it from there. In about ten days, you will receive your poll results along with 30 graphs telling you exactly how your group did. Now doesn't that sound easy?

(Cut Here)

Order Form

NEED Energy Education Poll Scanning Cards

Please Print:

Name _____

School _____

Street Address _____

City _____ State _____ Zip Code _____

Area Code/Telephone Number _____ Best hours to reach me _____

Please send me:

_____ (#) cards for the **elementary** poll (grades 4-6).

_____ (#) cards for the **secondary** poll (grades 7-12).

Mail completed form to :

NEED Poll Cards
NEED Project
P.O. Box 2518
Reston, VA 22090

NEED Energy Education Poll

This Is Not A Test
Because this is not a test but rather a survey of known knowledge please do not make any wild guesses! Select a response only if you are reasonably sure your response is correct. Choose the "I Don't Know" response only if you have absolutely no idea which of the responses is correct and are unable to even make an educated guess. Choose the "Undecided" response on the opinion questions if you have never formed an opinion on this issue, or if you are undecided on the issue. Using a No. 2 pencil, completely darken the circle on your Poll Response Card that best completes the sentence or best answers the question.

Conservation

1. Are you the type of person who is always careful not to waste energy? Does it bother you to see a light on in an empty room, or hot water being run needlessly, or home heating and cooling dollars being wasted? Which of the following statements best describes your energy saving habits?

   A. Super Energy Saver
   B. Energy Saver
   C. Occasional Energy Saver
   D. Energy Waster
   E. I usually don't pay attention to my energy use.

2. Which energy job consumes the greatest amount of energy in the American home during a year?

   A Lighting
   B. Refrigeration
   C. Heating/cooling rooms
   D. Heating hot water
   E. I DON'T KNOW

3. American automobile manufacturers can produce automobiles with higher mileage ratings. They can accomplish this by making cars smaller and lighter, with engines designed for efficiency rather than performance. Today, Americans want to purchase larger cars with high performance engines. Federal law could require the manufacture of more fuel efficient automobiles, which would extend gasoline supplies for many more years and help reduce air pollution. However, these regulations would limit the choice of the American car buyer and may hurt the domestic auto industry. Which of the five phrases below reflects your opinion on the following statement?

   Consumer buying habits, rather than federal law, should determine the fuel efficiency standards U.S. automakers should meet for their new cars.

   A. Strongly Agree
   B. Agree
   C. Disagree
   D. Strongly Disagree
   E. Undecided

4. In 1973, the average new automobile made in the U.S. got 13 miles per gallon (mpg). During the past 16 years mpg ratings have increased to 26 mpg. Which factor listed below was MOST responsible for this increase in mileage?

   A. Radial tires
   B. Lighter cars
   C. More fuel efficient engines
   D. Sleeker car body designs
   E. I DON'T KNOW

Renewable Energy

5. Solar energy is considered or classified as a renewable source of energy because it:

   A. was stored in fossil fuels millions of years ago.
   B. is clean and free to use.
   C. will be available for billions of years.
   D. can be converted into electrical or heat energy.
   E. I DON'T KNOW.

6. Wind, geothermal, biomass, and hydroelectric are also renewable sources of energy. What percent of the nation's total energy demand in 1988 was provided by renewable sources of energy?

   A. 1%
   B. 10%
   C. 33%
   D. 67%
   E. I DON'T KNOW

Secondary

7. Ethanol is an alcohol fuel made mostly from corn, which is blended in a mix of 10% ethanol and 90% gasoline to produce gasohol. Supporters of ethanol say that alcohol fuel reduces air pollution while at the same time makes use of a domestic source of fuel (corn). Opponents say that ethanol does little to displace foreign oil, provides little benefit to farmers, and could not compete with gasoline without its 60-cents per gallon subsidy from the federal government. Which of these five phrases reflects your opinion on the following statement?

   The federal government should continue to make laws to encourage the use of ethanol.

   A. Strongly Agree
   B. Agree
   C. Disagree
   D. Strongly Disagree
   E. Undecided

Fossil Fuels

8. Not enough petroleum (oil) is produced in the U.S. to meet the nation's demand for this transportation fuel. We must purchase or import petroleum from other countries each year. At what level would you feel that imports were starting to approach a dangerously high level, threatening the nation's economic and military security?

   A. 10% of demand
   B. 33% of demand
   C. 50% of demand
   D. 75% of demand
   E. I DON'T KNOW

9. Some feel that America's petroleum resources should be developed in Alaska's Arctic National Wildlife Refuge and in offshore areas. More domestically produced petroleum would reduce the level of imports and provide American jobs. Others feel that these areas are too valuable to chance an environmental mistake, and that we should buy petroleum from other nations while it is cheap. They feel that we should drill in these environmentally sensitive areas only when it is absolutely necessary. Some feel that this time has come, since it takes over five years to develop an oil field. Which of the five phrases below reflects your opinion on the following statement?

   The federal government should allow exploration and development of petroleum resources in Alaska and from offshore areas as soon as possible.

   A. Strongly Agree
   B. Agree
   C. Disagree
   D. Strongly Disagree
   E. Undecided

10. Many people are suggesting that more natural gas (methane) be used instead of coal and petroleum in the future. This is because natural gas is...

   A. the nation's most abundant fossil fuel.
   B. the cleanest of the fossil fuels.
   C. the cheapest source of heat energy.
   D. All three of the above reasons.
   E. I DON'T KNOW

11. Today natural gas is used for which of the following tasks:

   A. Transportation.
   B. A source for making plastics.
   C. Heating homes and buildings.
   D. All three of the above reasons.
   E. I DON'T KNOW.

12. Propane is a gas that is sometimes used instead of natural gas. You've probably seen propane being used if you've ever seen a hot air balloon, a recreational vehicle, or a truck heating asphalt for patching a road or the roof of a building. Which of the following characteristics is NOT common to both propane and natural gas?

   A. Clean burning
   B. Odorless
   C. Colorless
   D. Easily portable
   E. I DON'T KNOW

13. The U.S. has approximately 300 years of known coal reserves and is the world leader of known coal reserves. In 1988, the major use of coal in the U.S. was to:

   A. make electricity.
   B. fuel trains.
   C. make steel.
   D. heat homes and buildings.
   E. I DON'T KNOW.

14. The term global warming has been in the news a great deal lately. Some scientists believe that the earth is warming because of "greenhouse" gases being put into the atmosphere from both natural and man-made sources. Even a three degree Centigrade warming of normal temperatures year round would cause very dangerous effects. From their studies, these scientists recommend that immediate and significant action be taken to lower greenhouse gases. Other scientists say that the recent years of warm weather are just part of a normal cycle in weather patterns. They feel we should try to lower "greenhouse" gases, but should not do it so quickly that we put an economic strain on the nation's economy and sacrifice American jobs. Which of the five phrases below reflects your opinion on the following statement?

More research needs to be done before beginning expensive, and perhaps ineffective, measures to reverse the global warming trend.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided

Electrical Energy

15. Presently, what percent of U.S. electricity is generated by nuclear energy?

A. 5%
B. 10%
C. 20%
D. 40%
E. I DON'T KNOW

16. Advocates say that nuclear power reduces U.S. dependence on imported petroleum, saves consumers millions of dollars each year, does not cause air pollution or contribute to global warming, and that nuclear power plants are safe to operate. Opponents of nuclear power say that the power plants are unsafe because of their construction and operation. They also say that nuclear power plants usually run way over budget, and that consumers are forced to pay for the mistakes of utility companies. Supporters of nuclear power say that cost overruns are the result of needless delays and regulations. Which of these five phrases reflects your opinion on the following statement?

Nuclear power should play an increasing role in providing the nation with its future electrical energy demands.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided

17. One kilowatt hour of electricity will operate a television set for approximately ten hours. In 1988, what was the average price for a kilowatt hour in the U.S.?

A. $0.08
B. $0.57
C. $1.07
D. $1.70
E. I DON'T KNOW

18. In the past 16 years the U.S. economy has grown 46% and the population 16%. However, because the nation has become more energy efficient our energy usage has grown only 8%. During that same period of time, demand for electricity has grown by what percent?

A. 1%
B. 10%
C. 33%
D. 50%
E. 75%
F. I DON"T KNOW?

19. If a power plant could convert into electricity all the heat energy it produces from burning a fossil fuel we would say it was 100% efficient. Today's electric power plants are 30-45% efficient, up from just a 10% efficiency in the early 1900's. Which of these five phrases reflects your opinion on the following statement?

Improved technology will eventually enable power plants to be 100% efficient, converting all the energy they consume into electricity.

A. Strongly Agree
B. Agree
C. Disagree
D. Strongly Disagree
E. Undecided

20. America's throwaway society is fast running out of space to toss its trash. In recognition of this, and in order to save energy, some communities have enacted mandatory recycling programs where residents must pay deposits on bottles and cans, or must sort their garbage for trash pickup. Other communities have set up voluntary programs where residents can sort their garbage if they want to. Some of these programs can be very successful. Most community planners agree that recycling is important, but they disagree about the type of recycling program. Which of the five phrases below reflects your opinion on the following statement?

    Americans should be required by law to separate their trash into three or more containers for recycling purposes.

    A. Strongly Agree
    B. Agree
    C. Disagree
    D. Strongly Disagree
    E. Undecided

21. Plastics are made from fossil fuels. Some say we should make fewer plastics to conserve fossil fuel, while others point out that plastics are lightweight and efficient, and the use of more plastics conserves energy. Furthermore, through burning, the energy content of the plastics can be recovered in waste-to-energy plants to produce electricity. Opponents to plastics say that plastics are not presently being recycled, take up too much space in our dwindling landfills, and are not biodegradable. Supporters of using plastics say that you do not want material to break down in a landfill because degrading materials may escape into the groundwater or air, and plastic recycling is becoming more popular. Which of these five phrases reflects your opinion on the following statement?

    We should use more plastics, not less.

    A. Strongly Agree
    B. Agree
    C. Disagree
    D. Strongly Disagree
    E. Undecided

NEED Energy Education Poll

This Is Not A Test
Because this is not a test but rather a survey of known knowledge please do not make any wild guesses! Select a response only if you are reasonably sure your response is correct. Choose the "I Don't Know" response only if you have absolutely no idea which of the responses is correct and are unable to even make an educated guess. Choose the "Undecided" response on the opinion questions if you have never formed an opinion on this issue, or if you are undecided on the issue. Using a No. 2 pencil, completely darken the circle on your Poll Response Card that best completes the sentence or best answers the question.

Conservation

1. Which of the following statements best describes your energy saving habits?

   A. Super Energy Saver
   B. Energy Saver
   C. Energy Waster
   D. I usually don't pay attention to my energy use

2. Which energy job uses the greatest amount of energy in the American home?

   A. Lighting
   B. Heating/cooling rooms
   C. Heating hot water
   D. I DON'T KNOW

3. Should laws be made to force people to save energy in their cars and homes?

   A. Definitely no
   B. Only in an emergency
   C. Yes, because people won't do it on their own
   D. I'm not sure

Renewable Energy

4. Solar energy is a renewable energy source. Renewable means it:

   A. was stored in fossil fuels millions of years ago
   B. is clean and free to use
   C. will be available for billions of years
   D. I DON'T KNOW

5. Which of the following renewable sources of energy uses wood, garbage, and corn as fuels?

   A. Geothermal
   B. Biomass
   C. Solar
   D. I DON'T KNOW

Fossil Fuels

6. Coal, petroleum (oil) and natural gas are fossil fuels. They are called fossil fuels because:

   A. we burn them to release energy
   B. they are formed from the buried remains of plants and animals that lived millions of years ago
   C. they are non-renewable
   D. I DON'T KNOW

7. The U.S. has a 300–year supply (more than the other two combined) of which fossil fuel?

   A. Coal
   B. Natural Gas
   C. Petroleum
   D. I DON'T KNOW

8. Which is the cleanest-burning fossil fuel?

   A. Coal
   B. Natural Gas
   C. Petroleum
   D. I DON'T KNOW

9. The major use of coal in the United States is to:

   A. make electricity
   B. fuel trains
   C. heat homes and buildings
   D. I DON'T KNOW

10. Propane gas is used instead of natural gas in hot air balloons, recreational vehicles and on many farms and rural areas. Why is propane often used instead of natural gas?

A. It's cleaner
B. It's safer
C. It's portable
D. I DON'T KNOW

Electrical Energy

11. One kilowatthour of electricity will operate a television set for approximately ten hours. In 1988, what was the average price for a kilowatt hour in the U.S.?

A. $0.08
B. $0.57
C. $1.07
D. I DON'T KNOW

12. Which energy source was responsible for generating over half the nation's electricity in 1988?

A. Coal
B. Nuclear
C. Hydropower
D. I DON'T KNOW

13. Uranium is used to make electricity in a nuclear power plant. The uranium atoms give off energy when:

A. they combine and give off heat energy
B. they split and give off heat energy
C. they are burned and give off heat energy
D. I DON'T KNOW

14. Nuclear power doesn't pollute the air,it is cheap, and helps save fossil fuels. A major problem with nuclear power is the danger of the radioactive waste it produces and the possibility of a nuclear accident. Which statement best describes your feelings about this?

A. We should build more nuclear plants.
B. We shouldn't build any more nuclear plants, but it's fine to continue using the ones we have.
C. We shouldn't build more nuclear plants and should stop using the ones we have.
D. UNDECIDED?

Solid Waste and Energy

15. In many communities, laws have been made that require people to put glass, metals, and paper into separate trash containers so that they can be recycled. Which statement best describes your feelings about this?

A. I think this is a great idea and would like my community to have this law.
B. I think people should separate their trash, but I don't want a law that forces us to do it.
C. I don't think recycling is important.
D. UNDECIDED?

16. Plastics are lightweight, help save energy, and when burned can produce electricity. Some people feel we should use fewer plastics because only a small amount is currently recycled, and it takes up a lot of space in landfills. Which statement best describes your feelings about this?

A. We need to stop using plastics entirely.
B. We will always need plastics, but we should use other materials whenever we can.
C. We should continue to use plastics whenever we can.
D. UNDECIDED?

NATIONAL ENERGY EDUCATION POLL

Distribution of Answers
Correct answers for knowledge questions are underlined.

Secondary School Students (%)

	A	B	C	D	E
1.	5	28	44	4	19
2.	22	8	<u>43</u>	7	20
3.	9	30	18	8	34
4.	2	<u>11</u>	56	7	23
5.	3	11	<u>35</u>	31	20
6.	6	<u>15</u>	21	8	51
7.	13	35	14	5	33
8.	5	18	32	15	30
9.	9	28	21	16	25
10.	8	<u>15</u>	9	39	29
11.	6	4	38	<u>28</u>	24
12.	13	32	11	<u>14</u>	30
13.	21	13	15	21	31
14.	22	37	11	6	23
15.	11	15	<u>22</u>	17	35
16.	10	26	21	13	30
17.	<u>10</u>	15	16	9	49
18.	4	14	24	<u>16</u>	42
19.	11	36	19	6	30
20.	24	30	16	8	22
21.	8	18	24	19	31

NOTE: Numbers may not add up to 100% because of rounding and improperly marked score cards.

NATIONAL ENERGY EDUCATION POLL

Distribution of Answers
Correct answers for knowledge questions are underlined.

Middle School Students (%)

	A	B	C	D
1.	12	46	6	36
2.	33	38	9	21
3.	17	33	27	23
4.	5	17	55	23
5.	13	33	8	46
6.	19	53	11	17
7.	26	28	15	31
8.	13	44	19	24
9.	23	21	38	18
10.	15	35	20	30
11.	8	18	25	49
12.	18	30	26	26
13.	15	30	19	36
14.	13	45	19	24
15.	42	38	6	14
16.	7	59	13	21

NOTE: Numbers may not add up to 100% because of rounding and improperly marked score cards.